Sustainable Seas Expeditions

Cruise Plan

March 29, 1999

Gulf of the Farallones National Marine Sanctuary
Fort Mason, Building 201
San Francisco, CA 94123
ph. (415) 561-6622
fax (415) 561-6616

CRUISE INSTRUCTIONS: **Final**

NOAA Ship: McARTHUR Cruise Number: AR-99-02

Cruise Title: Sustainable Seas Expeditions
Cruise Dates: April 16 - April 26, 1999
Study Area: Gulf of the Farallones National Marine Sanctuary

Sponsoring Institution: NOAA's National Ocean Service (NOS), Gulf of the Farallones National Marine Sanctuary (GFNMS), Sustainable Seas Expedition (SSE), National Geographic Society (NGS)

Cruise Description and Objectives: The primary objective during the first year of the SSE will be to characterize subtidal habitats and assess algae, invertebrate, and fish populations within the Gulf of the Farallones National Marine Sanctuary (GFNMS). This data will also be used to develop educational and outreach materials for the Sanctuaries. In addition, GFNMS and the National Ocean Service (NOS) will use this unique opportunity to increase public awareness and appreciation for our nation's Marine Sanctuaries and the work of the National Ocean Service (NOS). This will be accomplished through outreach and media events.

The primary goal of the Ecosystem Dynamics Study (EDS) is to continue a long term monitoring project investigating relationships between distinct hydrographic features and the distribution and abundance of marine organisms in the Gulf of the Farallones.

Synopsis of Scientific Measurements:
Sampling will consist of a series of video and visual transects completed over predetermined areas. The initial effort will focus on subtidal areas in the vicinity of the Farallon Islands. Abundance and distribution data for algae, invertebrates and fishes collected during this phase of the project will help direct the sampling design for work in the following years. Water column parameters will be measured for the EDS with Seacat casts at each station. Plankton will be sampled with a Tucker trawl and Manta net.

Sustainable Seas Expedition

- Use the DeepWorker to complete video transects characterizing habitats, benthic algae and invertebrate communities
- Estimate distribution and abundance of fishes with video and visual transects using DeepWorker
- Collect information and images to be used in media, education and outreach efforts

Ecosystem Dynamics Study

- Measure physical attributes of the water column to characterize distinct hydrographic features particularly those associated with the Pt. Reyes upwelling jet

- Identify diel distribution and abundance patterns of phytoplankton and zooplankton
- During daytime sampling, complete visual transects to assess distribution and abundance of seabirds and marine mammals while transiting between plankton stations

Chief Scientist: Sylvia Earle - SSE
Dan Howard - EDS

1.0 ORGANIZATIONAL STRUCTURE - *(Definition of specific roles/ responsibilities are currently being negotiated and will be forwarded to you)*

1.1 STRUCTURE

- *Commanding Officer* - Final approval authority for all operations. Both the Commanding Officer and Dive Supervisor must agree that conditions are acceptable for the submersible to be launched.

- *Dive Supervisor* - Responsible for the procedures and coordination of all dive operations. Both the Commanding Officer and Dive Supervisor must agree that conditions are acceptable for the submersible to be launched.

- *Chief Scientist* - Responsible for collaborating with the CO, Dive Supervisor, and Mission Coordinator to implement the Cruise Plan and to develop the "Plan of the Day" (POD). The Chief Scientist has decision-making authority for any departures from the schedule, planned activities, or personnel.

- *Mission Coordinator* – Responsible for collaborating with the CO, Dive Supervisor, and Chief Scientist to implement the Cruise Plan and to develop the POD. The Mission Coordinator is also responsible for organizing and overseeing the processing, storage, and transmittal of data and information collected during submersible dive operations.

- *Principal Investigator* - Responsible for the individual project content.
- *Pilot* - Certified DeepWorker pilot approved for the specific mission dive.
- *Mission Log Coordinator* – Responsible for compiling the Mission Log for the NGS SSE Web site.

1.2 PROTOCOL

Dive Authority – The Commanding Officer and the Dive Supervisor will make the final decision on dive operations.

Project implementation – The CO, Dive Supervisor, Chief Scientist, Mission Coordinator, and other required personnel will develop the POD based on the Cruise Plan. Both the Commanding Officer and Dive Supervisor must agree that conditions are acceptable for the submersible to be launched, while the Chief Scientist has decision-making authority for any departures from the schedule, planned activities, or personnel.

2.0 OVERVIEW OF OPERATIONS

In April of 1998 NOAA entered into a five year cooperative project with the National Geographic Society to explore the nation's 12 National Marine Sanctuaries. As part of this effort, called the Sustainable Seas Expedition (SSE), the Gulf of the Farallones National Marine Sanctuary (GFNMS), the National Marine Fisheries Service Tiburon Laboratory, Farallones Marine Sanctuary Association and associated scientists will be using the R.V. McARTHUR to complete field studies from 16 April to 26 April, 1999. During daytime hours,

scientists and educators will be operating a one person autonomous submarine called the DeepWorker to characterize subtidal habitats and assess algae, invertebrate and fish populations in the vicinity of the Farallon Islands. At night and when sea conditions preclude sub operations, scientists will conduct plankton tows and Seacat casts at established sampling locations in the Gulf of the Farallones. This work is part of a long term monitoring effort investigating ecosystem dynamics. Educational and promotional events will occur during the cruise to complement the exploration and research activities.

3.0 ITINERARY

APRIL

13 1600 Ship arrives pier 32 San Francisco
14 0800 Scientists arrive and begin loading gear and equipment
15 0800 Scientist finish loading any remaining gear

16 0700 Ship departs pier 32 and transits to Southeast Farallon Island (SEFI)
1000 Ship on site East Landing - Southeast Farallon Island
1100 Begin launch and recovery operations with new pilots - Sylvia Earle, Francesca Cava, Kip Evans. Ed Ueber (EU), Dan Howard (DH), and Maria Brown (MB) as time allows
1800 Complete launch and recovery operations
2000 When DeepWorker operations are complete, proceed to first station for Ecosystem Dynamics Study (EDS) - plankton work and Seacat casts

17 0530 On station at SEFI for SSE dives
0800 Predive meeting in wardroom
0930 Project #1 -Dive #1
1400 Project #1 -Dive #2
2000 When DeepWorker operations are complete, proceed to EDS site - plankton work and Seacat casts

18 0530 On station at SEFI for SSE dives
0800 Predive meeting in wardroom
0930 Project #1 -Dive #3
1400 Project #1 -Dive #4
2000 When DeepWorker operations are complete, proceed to EDS site - plankton work and Seacat casts

19 SSE Contingency Day
2000 proceed to EDS site - plankton work and Seacat casts

20 0530 On station at SEFI for GFNMS
0730 Predive meeting in wardroom
0800 RHIB operations to transport Sylvia to mainland
0900 -1030 Project #2 - Dive #1
1200 - Begin launch and recovery operations with GFNMS pilots - Ed Ueber (EU), Dan Howard (DH), and Maria Brown (MB)- three dives at two hours each
1800 Complete launch and recovery operations

2000 When DeepWorker operations are complete, proceed to first station for Ecosystem Dynamics Study (EDS) - plankton work and Seacat casts

21
0530 On station at SEFI for GFNMS
0730 Predive meeting in wardroom
0900 - 1100 Project #3 - Dive #1
1230 - 1430 Project #3 - Dive #2
1600 - 1700 Project #3 - Dive #3
2000 When DeepWorker operations are complete, proceed Pier 30 to prepare for Earth Day event on the 22nd

22
0900 - 1100 Media event at pier 30, dockside interviews, Sylvia simulates dive from McARTHUR (need to consider tidal currents)
1200 - 1400 Lunch on board McARTHUR for VIPs and press
1600 Depart for EDS site
1900 Arrive at EDS site and begin sampling

23
0530 On station at SEFI for GFNMS
0730 Predive meeting in wardroom
0900 - Begin launch and recovery operations with new GFNMS pilots - Jan Roletto (JR), Karina Racz (KR), Tom Laidig (TL), Amber Mace (AM)- four dives at two hours each
0930 - When DeepWorker operations are complete, proceed to first station for EDS work - plankton and Seacat casts

24
0530 On station at SEFI for GFNMS
0730 Predive meeting in wardroom
0900 - 1100 Project #3 - Dive #4
1230 - 1430 Project #3 - Dive #5
1600 - 1730 Project #3 - Dive #6
1930 - When DeepWorker operations are complete, proceed to first station for EDS work - plankton and Seacat casts

25
0530 On station at SEFI for GFNMS
0730 Predive meeting in wardroom
0900 - 1100 Project #3 - Dive #7
1230 - 1430 Project #3 - Dive #8
1600 - 1730 Project #3 - Dive #9
1930 - When DeepWorker operations are complete, proceed to first station for EDS work - plankton and Seacat casts

26
0400 complete EDS work and head towards Bodega Harbor for student summit.
0600 McARTHUR on anchor in Bodega Bay

0900 RHIB Operations to ferry media from Spud Point Marina to ship
1100 RHIB operations to ferry media and staff participating in student summit to public boat ramp area on north side of channel.
1300 - 1530 Student Summit at Bodega Marine Laboratory
1730 RHIB operations to ferry scientific staff back to McARTHUR
2130 McARTHUR departs Bodega Bay and heads to first EDS station. Begin sampling when on station.

4.0 PROJECT DESCRIPTIONS

Project descriptions provide summary information on each project. Appendix A will list geographic positions of transects, sites, and stations. Use the following format and include any contingency dives (NOTE: Contingency dives provide information on potential alternative dives to be conducted if a scheduled project cannot be conducted at the primary or alternative locations).

4.1 DIVE PROJECTS

Project #1: SSE Dives
Principle Investigator: Sylvia Earle
Objective: Exploration
Task: Conduct video surveys

Dive #	Pilots	Location	Max Dive Depth	Depth to Bottom	Duration (hrs)
1	Sylvia Earle	37˚53'30" - 123˚19'00"	300	330	2.5
2	Francesca Cava	37˚48'35" - 123˚12'10"	200	240	2.5
3	Sylvia Earle	37˚47'30" - 123˚10'00"	240	280	2.5
4	Francesca Cava	37˚49'10" - 123˚11'10"	200	240	2.5

Dive 1 Rittenburg Bank
Dive 2-4 Fanny Shoals
Currents could be a factor
Alt Site: #1 - East Landing SEFE 130 feet
#2 - Drake's Bay, 70 feet
No Special Equipment

Project Dive #2: Document Sanctuary resources and SSE activities
Principal Investigator: Kip Evans
Objective: Collect photographic record of Sanctuary resources and SSE activities
Task: Shoot still photographs and video footage

Dive #	Pilots	Location	Max Dive Depth	Depth to Bottom	Duration (hrs)
1	Kip Evans	37˚42'08" - 123˚00'08"	120	120	1.5
1	Nuytco pilot	37˚42'08" - 123˚00'08"	120	120	1.5

Plan is to have both DeepWorkers in the water at the same time at Fisherman's Bay, SEFI. Kip would photograph the second sub piloted by a certified pilot to get underwater images of DeepWorker in the habitat. White Shark activity in the area makes SCUBA diving potentially hazardous. Stand-by divers should be available, however, for emergency response.
Alt Site: East Landing, SEFI, 100 feet.
Equip Sub: 35mm still and video camera systems, second sub operated by Nuytco pilot to
Equip Ship: Divers on stand-by, emergency response plan

Project Dive #3: Characterize habitat subtidal habitat in the vicintiy of the SEFI
Principal Investigator: Ed Ueber
Objective: Assess habitat, algae, invertebrates and fish assemblages
Task: Conduct video and visual transects, take still photographs

Dive #	Pilots	Location	Max Dive Depth	Depth to Bottom	Duration (hrs)
1	Ed Ueber	37°41′48″ 122°59′47″	130	130	2
2	Dan Howard	37°41′53″ 122°59′47″	130	130	2
3	Maria Brown	37°41′58″ 122°59′47″	130	130	1
4	Jan Roletto	37°41′56″ 122°59′40″	130	130	2
5	Tom Laidig	37°41′58″ 122°59′45″	130	130	2
6	Amber Mace	37°42′03″ 122°59′55″	130	130	1.5
7	Karina Racz	37°42′13″ 123°00′06″	120	120	1.5
8	Ed Ueber	37°42′11″ 123°00′03″	120	120	2
9	Dan Howard	37°42′10″ 122°59′58″	120	120	2

Dive 1-3 East Landing, SEFI
Dive 4-6 Shubrick Point, SEFI
Dive 7-9 Fisherman's Bay, SEFI
Alt Site: Drake's Bay, 70 feet
Eq

0900-1100, Interview opportunities
1200-1400, lunch for VIP's on the McARTHUR

Alternative Date and Time: April 21, 1999
Specific Request from Ship: Planning to have lunch catered but may want to set tables and food up on fantail. Need weather contingency

Event Name:Student Summit at Bodega Marine Laboratory
Purpose:Introduce local high schools to SSE and Sanctuaries Program
Primary Participants: High Schools
Date and Time: 1200 - 1600, April 26
May request RHIB operations in morning approximately 0900 to transport a local media out to the McARTHUR for interviews in the morning

4.3 ADDITIONAL PROJECTS

Any other work done during the cruise period will be subordinate to the main project and performed so as to not interfere with that outlined in these instructions. The Chief Scientist will be responsible for determining the priority of additional work relative to the main project. Additional projects are related to the cruise, but are to be conducted at night or during extended down times of the SSE. Examples include

side-scan sonar or net tow operations. Please use the following format to provide information on these projects:

Project: Ecosystm Dynamics Study
Principal Investigator: Dan Howard
Objective: Look at relationship between water masses and distribution and abundance of organisms.
Task: Seacat casts, manta tows, tucker trawls. If daytime operations occur, we will be conducting marine mammal and seabird surveys while transiting between sampling stations.
Location: Appendix B
Equip Ship: Starboard Hydro winch and operator
Inclinometer

Equip. Scientific Party: Will supply all sampling equipment

5.0 OPERATIONAL PLANS

The following operational plans can only be considered a guide as to how the Chief Scientist expects the project to progress without being able to predict the weather, operational and scheduling problems, and equipment failures. Appendix A will list geographical positions of transects, sites, and stations.

5.1 SSE PROJECTS

Project Dive one will be dedicated to Sylvia Earle and SSE. These dives will be exploratory in nature but we will have the video camera running to document subtidal habitat characteristics.
Project dive 2 will be dedicated to documenting DeepWorker operations. Due to the presence of white sharks in the area, we are requesting that both subs be deployed so we can get images of the DeepWorker in the habitat. Kip Evans the NOAA photographer would be one pilot and a qualified pilot cleared by Nuytco would operate the second sub.
The Gulf of the Farallones project dives are all designed to characterize habitats and assess algae cover, invertebrate and fish populations. Once on the bottom, a series of 10 minute transects will be conducted along a predetermined course. Transects will be punctuated every ten minutes by life support checks with Nuytco personnel. All projects will include visual observation and documentation using voice and video recorders as well as still photographs.

5.2 ADDITIONAL PROJECTS

Ecosystem Dynamics Study
During the course of the cruise, we will be sampling a grid 15 stations in the Gulf of the Farallones. The grid consists of five lines with three sampling stations on each line. Stations are spaced from nearshore to the edge of the continental shelf. The ADCP and thermosalinograph will run continuously during the cruise. An AVHRR satellite image of sea surface temperature will be downloaded each day, or as cloud cover allows, from the CoastWatch group in La Jolla, CA.

One complete pass of the 15 stations in the Gulf of the Farallones (Appendix A) will take approximately 30 hrs. Operations will be conducted at night and opportunistically during daylight hours. Daytime operations will depend on the DeepWorker schedule and sea conditions.

At each station, the sampling will consist of a Seacat cast, a 15 minute surface manta net tow and a Tucker trawl. The Tucker trawl will be sent to depth (max 120m) and retrieved at 10 meters per minute. At a predetermined depth, a messenger will be sent down the wire to close one net and open a second net. There will be two discreet samples, a deep and a shallow, from each Tucker trawl. Ship speed will be maintained at 1.5 - 2.0 kts while towing the manta net, and at the necessary speed to maintain wire angle at 45 degrees for the Tucker trawl (2-3 kts), and stationary for the Seacat casts. Water samples will be taken periodically with the ship's CTD for post cruise calibration of the Seacat. We will be using the starboard hydro winch for deployment of sampling equipment. Seabird and marine mammal surveys will be conducted from the flying bridge on transects between sampling stations during daylight hours.

6.0 CONTACT PERSONNEL

Scientific Operations:	
Gulf of the Farallones	Chief Scientist -Sylvia Earle
National Marine Sanctuary	alternate - Francesca Cava

Dan Howard
Fort Mason, Bldg 201
San Francisco, CA 94123
Ph. (415) 561-6622

Ship Operations:
NOAA Pacific Marine Center
LT Dana Wilkes
1801 Fairview Ave, E.
Seattle, WA, 98102
Office - 206-553-4548 Fax - 206-553-1109

7.0 SCIENTIFIC PERSONNEL

7.1 The Chief Scientist is authorized to alter the scientific portion of this cruise plan with the concurrence of the Commanding Officer, provided that the proposed changes will not: (1) jeopardize the safety of personnel or the ship (2) exceed the time allotted for the cruise (3) result in undue additional expense or (4) change the general intent of the project.

7.2 PARTICIPATING SCIENTISTS

Date* - *include dates if not aboard for entire project.

Name	Gender / Nationality	Position	Organization	Date
Daniel Howard	M / USA	Mission Coord.	CBNMS	Apr16-26
Ed Ueber	M / USA	Pilot	GFNMS	Apr16-26
Maria Brown	F / USA	Pilot	FMSA	Apr16-21
Tom Laidig	M / USA	Pilot	NMFS	Apr22-26
Jan Roletto	F / USA	Pilot	GFNMS	Apr16-26
Karina Racz	F / USA	Pilot	FMSA	Apr22-26
Amber Mace	F/ USA	Pilot	FMSA	Apr22-26
Jamie Hall	M / USA	Plankton	volunteer	Apr16-26
Kathy Suave	F/USA	Tchr a sea	NOAA	Apr16-21

7.3 PARTICIPATING TECHNICIANS

NAME	Gender/Nationality	Project	Organization	Date*

7.4 OTHER PERSONNEL

media people on board for the morning of April 22nd

7.5 MEDICAL FORMS

All personnel participating on board will complete a NOAA health Services Questionnaire prior to embarking on the vessel. Forms will be completed and submitted to the Commanding Officer per NOAA Corps Instruction 6000.

8.0 DATA RESPONSIBILITIES

8.1 DATA AND SAMPLES

8.1.1 The Chief Scientist via the Mission Coordinator is responsible for the data quality, disposition, and archiving of data and samples collected aboard the ship for the primary project. As the representative of the cruise sponsor, the Chief Scientist is also responsible for the dissemination of copies of these data to participants on the cruise and to any other requesters.

8.1.2 The Commanding Officer will give the acting Chief Scientist a single copy of all data collected by ship's personnel. The ships Scientific Computer System (SCS) will collect data continuously during the project. The SCS data will be provided to the Chief Scientist at the completion of the project. The Chief Scientist will provide the Commanding Officer a list of all data collected by the scientific party.

8.1.3 the Commanding Officer is responsible for all data collected for ancillary projects until those data have been transferred to the projects' Principal Investigator.

8.2 RECORDS AND REPORTS

8.2.1 Marine Operations Abstract (MOA). McARTHUR's officers will maintain the MOA during the cruise. The ship's position will be entered for all operations, and otherwise every 30 minutes or when changing course or speed. The Commanding Officer will give the Mission Coordinator a copy of the MOA at the completion of the project.

8.2.2 Pre Dive forms will be used to check out the sub prior to each dive and are the responsibility of the pilot and dive crew. Pre Dive forms will be signed by the Dive Supervisor.

8.2.3 Dive Logs will be used to keep track of the subs performance during each dive and are the responsibility of the Dive Supervisor or designee.

8.2.4 The Mission Coordinators Log will provide an accounting of the project work being conducted during each dive and are the responsibility of the Mission Coordinator.

8.2.5 The Mission Log will be based on a compilation of materials collected during dive operations (audio, video, photographs) and information collected post-dive (text provided by pilots), and will be posted on the NGS SSE Web site. The Mission Log is the responsibility of the Mission Log Coordinator.

8.2.6 The Mission Coordinator will complete the Ships Operations Evaluation Form and forward to the Office of NOAA Corps Operations.

8.2.7 All film collected during the cruise will be handled in accordance with the MOU between NOAA and NGS.

9.0 EQUIPMENT LISTS

9.1 SUPPLIED BY THE SCIENTIFIC PARTY:

(a) manta net
(b) Tucker trawl with sliding messengers for 1/4” wire
(c) flow meters for plankton nets (2)
(d) SeaBird SBE19 CTD with Wetstar fluorometer
(e) sample jars (quart mason)
(f) 3 gallons formalin
(g) 5 gallons Alcohol 95% Etoh
(h) Microscope, dissecting equipment, sample supplies
(i) salinity bottles

(j) chemical spill clean up kit
(k) Time depth recorder
(l) sample sieves and buckets
(m) spotting scopes and binoculars
(n) computers
(o) gps for seabird and marine mammal surveys

9.2 SUPPLIED BY THE McARTHUR:

(a) A frame and winch with 1/4 or 3/16 diameter wire
(b) starboard hydro winch
(c) inclinometer
(d) EQ-50 depth sounder with wiring to connect to VCR
(e) thermosalinograph interfaced with computer and GPS
(f) ADCP configured and interfaced with computer
(g) freezer space for one dozen water samples (one quart jar = sample)
(h) position logs
(i) bathymetric and navigation equipment
(j) daily satellite image of sea surface temperature
(k) niskin bottle
(l) power to flying bridge for laptop computer

9.3 SUPPLIED BY NUYTCO
(a) two DeepWorker submarines
(b) 3 people for technical assistance
(c) necessary equipment and supplies to keep subs operational

10.0 ANCILLARY PROJECTS

10.1 ANCILLARY PROJECTS: Ancillary projects are secondary to the objectives of the cruise, should be treated as additional investigations, do not have representation aboard, and are accomplished by the ship's force.

10.1.1 Ancillary tasks will be accomplished in accordance with the NOAA Fleet Standing Ancillary Instructions.

11.0 MISCELLANEOUS

11.1 Navigation Control: Shipboard DGPS provided for vessel. Submersible navigation provided by NUYTCO

11.2 Required Compliance: The Chief Scientist will require each Mission Coordinator to contact local authorities to increase the safety and awareness of the operations. These authorities include :

11.2.1 US Coast Guard Station responsible for the area of coverage in the cruise instructions.

11.2.2 Local Notice to Mariners in the district concerning the area covered in the cruise instructions.

11.2.3 Port Authority or Harbor master for potential dive sites.

11.3 Meals for all scientific party members will charged to the host organization in accordance with NOAA Administrative Order 203-100. The Chief Scientist will provide the Commanding Officer with the appropriate accounting codes.

11.4 Pre-Cruise Meeting: A pre-cruise meeting between the Chief Scientist, the Commanding Officer, the Mission Coordinator, and the Dive Supervisor will be held prior to the commencement of operations to do a final review of the cruise plan.

11.5 Post-Cruise debrief: A post-cruise debriefing between the Chief Scientist, the Commanding Officer, the Mission Coordinator, the Dive Supervisor, and the Mission Coordinator for the next site will be held to review any problems that occurred.

11.6 HAZMATS - 3 gallons Formalin will be accompanied by MSDS
5 gallons ETOH with MSDS

12.0 COMMUNICATIONS

12.1 McARTHUR will communicate daily, Monday through Friday, with the Pacific Marine Center. Normally this will be via email message, but radio contact will be maintained when possible.

12.2 Because the scientific staff must sometimes communicate with other research vessels, commercial vessels, and shore-based NOAA facilities, the Chief Scientist or his designee may request the use of radio transceivers aboard the vessel.

12.3 McARTHUR is equipped with INMARSAT and cellular telephone. The Chief Scientist may need access to these systems with permission from the Commanding Officer. The Commanding Officer will provide the Chief Scientist with a log of all calls made from the ship by the scientific party at the completion of the project.

13.0 APPENDICES

(A) List of Coordinates for tracklines or stations.

Starting positions for DeepWorker Assessments

Project 1

Dive 1 37° 53′ 30″ N 123° 19′ 00″ W

Dive 2 37° 48′ 35″ N 123° 12′ 10″ W

Dive 3 37° 47′ 30″ N 123° 10′ 00″ W

Dive 4 37° 49′ 10″ N 123° 11′ 10″ W

Project 2

Dive 1 37° 42′ 08″ N 123° 00′ 08″ W

Project 3

Dive 1 37° 41′ 48″ N 122° 59′ 47″ W

Dive 2 37° 41′ 53″ N 122° 59′ 47″ W

Dive 3 37° 41′ 58″ N 122° 59′ 47″ W

Dive 4 37° 41′ 56″ N 122° 59′ 40″ W

Dive 5 37° 41′ 58″ N 122° 59′ 45″ W

Dive 6 37° 42′ 03″ N 122° 59′ 55″ W

Dive 7 37° 42′ 13″ N 123° 00′ 06″ W

Dive 8 37° 42′ 11″ N 123° 00′ 03″ W

Dive 9 37° 42′ 10″ N 122° 59′ 58″ W

Positions for Gulf of the Farallones EDS Sampling:

37 39 122 37
37 35.5 122 46
37 30 122 56.5

37 38 123.04
37 44 122 55.5
37 50 122 47

37 45.5 123 11
37 52 123 02.5
37 57 122 53

37 52.5 123 18
37 58 123 10.5
38 05.5 123 03

38 13.5 123 07.5
38 06.5 123 15.5
38 00.5 123 23

(B) Chartlets
(C) Emergency Contact phone number
(D) Shuttle Launch Schedule:
May 20, 1999 - 0800 RHIB operations to transport Sylvia Earle from the McARTHUR to the Sanctuary office in San Francisco.
May 26 - 0900 RHIB operations to shuttle media from Bodega Harbor to McARTHUR
1100 RHIB operations to shuttle scientists and media from McARTHUR to Bodega Harbor
1730 RHIB operations to shuttle scientists from to Bodega Harbor to McARTHUR

(E) Table 1. Days on board the McARTHUR. x= on board

Sylvia Earle (SE), Francesca Cava (FC), Kip Evans (KE), Ed Ueber (EU), Dan Howard (DH), Maria Brown (MB), Jan Roletto (JR), Tom Laidig (TL), Amber Mace (AM), Karina Racz (KR), Kathy Suave (KS): Teacher at Sea

Date	SE	FC	KE	EU	DH	MB	JR	TL	AM	KR	KS
16	x	x	x	x	x	x					x
17	x	x	x	x	x	x					x
18	x	x	x	x	x	x					x
19	x	x	x	x	x	x					x
20	x	x	x	x	x	x					x
21		x		x	x	x					x
22		x		x	x		x	x	x	x	
23		x		x	x		x	x	x	x	
24		x		x	x		x	x	x	x	
25		x		x	x		x	x	x	x	
26		x		x	x		x	x	x	x	

Jamie Hall (Male) - will be on board the whole cruise conducting nighttime plankton operations

Table 2. Pilots dive days. L= Launch and recovery exercise x= dive day. April 19 is the SSE contingency day, I will insert Kip here as place holder and priority if available. April 22nd is earth day media event. April 26 is the student summit in Bodega Bay.

Date	SE	FC	KE	EU	DH	MB	JR	TL	AM	KR
16	L	L	L							
17	x	x		L						
18	x	x								
19			x							
20			x		L	L				
21				x	x	x				
22										
23							L	L	L	L
24							x	x	x	
25				x	x					x
26										

_____ _____ _____ _____

John C. Albright Date Sylvia Earle Date
Rear Admiral, NOAA Chief Scientist
Director, Pacific Marine Center Sustainable Seas Expeditions

_____ _____

Name Date
Mission Coordinator
Daniel F. Howard